Statement of Basis

Guam Waterworks Authority
Umatac-Merizo Sewage Treatment Plant
Final NPDES Permit No. GU0020273

I. INTRODUCTION/FACILITY DESCRIPTION

The Guam Waterworks Authority (permittee) owns and operates the Umatac-Merizo Sewage Treatment Plant (STP) which serves the Umatac and Merizo areas (approximately 3,500 persons) on the island of Guam. The Umatac-Merizo STP consists of the Waste Stabilization Pond Treatment System (a mechanically aerated treatment pond) and associated constructed wetland ponds of the Wetlands Treatment System. The Wetlands Treatment System consists of six ponds (cells) where secondary effluent from the aerated treatment pond is "polished" to reduce nutrient levels prior to effluent discharge into receiving waters. Advanced secondary effluent from the Wetlands Treatment System is discharged to Category S-3 (Low) receiving waters named Toguan River, tributary to Toguan Bay of the Pacific Ocean, through Discharge Serial No. 001: 13° 17' 02" N latitude, 144° 40' 00" E longitude. (Category S-3 waters are primarily used for commercial, agricultural, and industrial activities. Aesthetic enjoyment and compatible recreation are acceptable in this zone, as well as maintenance of aquatic life. Compatible recreation may include limited body contact activities.) This discharge serial is located approximately 1,100 feet upstream of the Toguan Bay estuary. While the Wetlands Treatment System became operational in 1996 (replacing malfunctioning percolation fields which had discharged partially treated wastewater into Toguan River), construction has not been completed. A schedule for timely completion of the Wetlands Treatment System will be included in the administrative order for this facility (see page 5 of this statement of basis for complete discussion of administrative order). The upgraded STP has an average daily design flow of 0.391 million gallons per day (MGD).

In accordance with Section 402 of the Clean Water Act (CWA), the U. S. Environmental Protection Agency, Region 9 (USEPA Region 9) is issuing a NPDES permit to the permittee for the discharge of treated domestic wastewater from Umatac-Merizo STP into the Toguan River. The STP outfall discharges within territorial waters of the Territory of Guam. Because the Guam Environmental Protection Agency (GEPA) has not been delegated primary regulatory responsibility for administering the NPDES program, the USEPA Region 9 is issuing a NPDES permit which incorporates both federal CWA and Guam water quality requirements. On March 14, 1995, the permittee submitted an application for a new NPDES permit. A draft permit was public noticed by the USEPA Region 9 on November 19, 1999. This Statement of Basis sets forth the principal facts and significant legal, methodological, and policy questions considered in the development of the permit. The permit is based on the Administrative Record.

II. DISCHARGE LIMITATIONS

When developing discharge limitations, the permitting authority must consider both limitations based on technology available to treat the pollutants (i.e., technology based limitations) and limitations that are protective of the designated uses of the receiving waterbody (i.e., water quality based limitations). Discharge limitations in the permit are based on USEPA regulations contained in Title 40 of the *Code of Federal Regulations* (CFR) and *Revised Guam Water Quality Standards* (WQS), amended and adopted on January 2, 1992.

Technology Based Discharge Limitations

The permit contains the following technology based discharge limitations for biochemical oxygen demand and total suspended solids:

Discharge Limitations				
Discharge Parameter	Average Monthly	Average Weekly	Maximum Daily	Units
Biochemical Oxygen Demand (5-day)	30 98	45 150	n/a	mg/l lbs/day
	The arithmetic mean of the BOD_5 values, by concentration, for effluent samples collected over a calendar month shall not exceed 15% of the arithmetic mean, by concentration, for influent samples collected at approximately the same times during the same period.			
Total Suspended Solids	30 98	40 130	n/a	mg/l lbs/day
	The arithmetic mean of the TSS values, by concentration, for effluent samples collected over a calendar month shall not exceed 15% of the arithmetic mean, by concentration, for influent samples collected at approximately the same times during the same period.			

The monthly average and weekly average discharge limitations for biochemical oxygen demand and monthly average discharge limitations for total suspended solids (in mg/l and influent percent removal efficiency) are based on federal secondary treatment effluent standards contained in 40 CFR 133.102(c). The weekly average discharge limitation for total suspended solids (in mg/l) is based on requirements contained in Section II.B.6 of *Revised Guam Water Quality Standards*. The discharge limitations for biochemical oxygen demand and total suspended solids (in lbs/day) are calculated using an average daily design flow of 0.391 MGD and the following equation: lbs/day = 8.34 x Ce x Q. "Ce" is the discharge limitation in mg/l and "Q" is the flow rate in MGD.

Water Quality Based Discharge Limitations

If, after technology based discharge limitations are applied, the permitting authority determines that the discharge may exceed applicable water quality criteria, then water quality based discharge limitations must be imposed. When deciding whether or not water quality based discharge limitations are needed to protect water quality, in accordance with 40 CFR 122.44(d), the permitting authority must determine whether the discharge causes, has the reasonable potential to cause, or contribute to an excursion of applicable numeric or narrative water quality criteria. As part of this evaluation, projected receiving water values – based on reported maximum discharge values – are compared to applicable water quality criteria to determine the "reasonable potential" for criteria exceedances and the need for discharge limitations. Because this discharge has not been granted a mixing zone by the GEPA, dilution (expressed as parts receiving water per part wastewater) is not considered in this evaluation and projected receiving water values are calculated using the following steady state equation: Cr = Ce. "Ce" is the reported maximum discharge value (in mg/l or ug/l) and "Cr" is the projected receiving water value (in mg/l or ug/l) which is then compared to the appropriate water quality criterion.

The USEPA Region 9 reviewed data provided by the permittee, including the following effluent data collected at Station J (effluent overflow structure at land disposal return basin):

Station ID	Date	Dissolved Oxygen (mg/l)	pH (units)	Temperature (°C)	Suspended Solids (mg/l)	Turbidity (NTU)	Fecal Coliform (CFU/100 ml)
J	07/24/89	7.3	8.00	30	8	45.0	TNTC
J	08/30/89	1.9	7.70	28	5	3.5	TNTC
J	09/26/89	4.0	7.9	29	15	5.0	TNTC
J	10/21/89	1.8	7.9	29	22	15.0	TNTC
J	11/25/89	1.9	7.7	27	19	4.9	TNTC
J	12/16/89	1.8	8.0	26	14	10.0	TNTC
J	01/31/90	5.0	7.5	26	26	7.5	TNTC
J	02/27/90	-----	8.3	26	31	20.0	TNTC
J	03/10/90	2.5	7.6	27	24	12.0	TNTC
J	04/28/90	1.5	8.60	27.0	114	25.0	TNTC
J	06/26/90	12.0	8.57	29.0	9	1.6	TNTC
J	07/23/98	-----	-----	-----	-----	-----	TNTC
J	08/28/98	-----	-----	-----	-----	-----	TNTC
J	09/29/98	-----	-----	-----	-----	-----	TNTC
J	10/15/98	-----	-----	-----	-----	-----	37

Station ID	Date	Dissolved Oxygen (mg/l)	pH (units)	Temperature (°C)	Suspended Solids (mg/l)	Turbidity (NTU)	Fecal Coliform (CFU/100 ml)
J	11/28/98	-----	-----	-----	-----	-----	TNTC
J	12/11/98	-----	-----	-----	-----	-----	TNTC
J	01/28/99	-----	-----	-----	-----	-----	TNTC
J	02/18/99	-----	-----	-----	-----	-----	TNTC

Based on this review, the USEPA Region 9 concluded that total suspended solids, *E. coli*, pH, and turbidity have the "reasonable potential" to exceed the following applicable WQS:

Effluent Characteristic	Average Monthly	Maximum Daily	Units
Total Suspended Solids	n/a	40	mg/l
E. coli	126	406	CFU/100 ml
Chlorine	11 (4-day average)	19 (1-hour average)	ug/l
pH	Not less than 6.5 nor greater than 8.5 at any time.		standard units
Orthophosphate (PO_4-P)	n/a	0.10	mg/l
Nitrate-Nitrogen (NO_3-N)	n/a	0.50	mg/l
Turbidity	n/a	1.0	NTU

To protect WQS and ensure proper operation and maintenance of the Wetlands Treatment System, the permit contains water quality based discharge limitations for the nutrients orthophosphate (PO_4-P) and nitrate-nitrogen (NO_3-N).

In accordance with 40 CFR 122.44(d), the permit contains the following water quality based discharge limitations (for total suspended solids, see discussion under *Technology Based Discharge Limitations*):

Discharge Limitations				
Effluent Characteristic	Average Monthly	Average Weekly	Maximum Daily	Units
E. coli	126	n/a	406	CFU/100 ml
Total Chlorine Residual	6.1 0.020	n/a	12 0.039	ug/l lbs/day
pH	Not less than 6.5 nor greater than 8.5 at all times.			standard units

Discharge Limitations				
Effluent Characteristic	Average Monthly	Average Weekly	Maximum Daily	Units
Orthophosphate (PO_4-P)	report	n/a	0.10 0.33	mg/l lbs/day
Nitrate-Nitrogen (NO_3-N)	report	n/a	0.5 1.6	mg/l lbs/day
Turbidity	n/a	n/a	1.0	NTU

The discharge limitations (in lbs/day) are calculated using an average daily design flow of 0.391 MGD and the following equation: lbs/day = 8.34 x Ce x Q. "Ce" is the discharge limitation in mg/l and "Q" is the flow rate in MGD.

Because the Umatac-Merizo STP discharge does not fully comply with water quality based discharge limitations for *E. coli*, the USEPA Region 9 is concurrently issuing an Administrative Order which will include: (1) a schedule of activities to ensure that the discharge will come into compliance with WQS during this permit term; and (2) interim discharge limitations based on current wastewater treatment plant performance. Reasonable control measures necessary to ensure compliance with WQS will likely include additional treatment to reduce bacterial indicator organisms in the discharge. Should the permittee elect to utilize a disinfection technology which relies on chlorine to reduce bacterial indicator organisms in the discharge, the permit includes discharge limitations for total chlorine residual. Discharge limitations for total chlorine residual (in ug/l) are based on WQS and are calculated using the statistical procedure outlined in Chapter 5 of the revised *Technical Support Document for Water Quality-based Toxics Control* (TSD; EPA/505/2-90-001, 1991). Discharge limitations (in lbs/day) are calculated using an average daily design flow of 0.391 MGD and the following equation: lbs/day = 8.34 x Ce x Q. "Ce" is the discharge limitation in mg/l and "Q" is the flow rate in MGD.

III. DISCHARGE AND RECEIVING WATER MONITORING PROGRAMS

The permit contains discharge monitoring requirements that are established based on best professional judgement. Parameters with discharge limitations are monitored at weekly intervals. Additional parameters including flow, enterococci, total Kjedahl nitrogen, ammonia nitrogen, dissolved oxygen, and temperature are also monitored weekly. Heavy metals, hardness, pesticides, oil and grease, and whole effluent toxicity (chronic) are monitored annually.

Receiving water monitoring requirements contained in the permit have been established based on best professional judgement and are necessary to evaluate the effects of the discharge on Toguan River and Toguan Bay. This monitoring program establishes receiving water parameters, monitoring frequencies, and sample types at specified station locations in the river and bay. Two

stations are located in Toguan River, above and below Discharge Serial No. 001, and one station is located offshore of the mouth of Toguan River in Toguan Bay. Flow, pH, orthophosphate (PO_4-P), nitrate-nitrogen (NO_3-N), dissolved oxygen, turbidity, and temperature are monitored weekly. Enterococci is monitored bi-monthly.

IV. CONSTRUCTED WETLANDS WASTEWATER TREATMENT SYSTEM OPERATIONS AND MAINTENANCE PLAN

The permit requires the permittee to develop and implement a Wetlands Wastewater Treatment System Operations and Maintenance Plan. This plan is essential to ensure efficient management of the physical and biological characteristics of the wetlands treatment system. The plan will include descriptions of appropriate physical and biological measures necessary to efficiently manage the wetlands treatment system based on site monitoring results and design considerations, including pretreatment (prior to wetlands polishing), vegetation, soil, and hydrological management. The plan will also include a soils monitoring plan designed to assess toxic accumulations of nutrients, metals, and oil and grease in each cell of the constructed wetlands treatment system.

V. SLUDGE/BIOSOLIDS LIMITATIONS AND MONITORING REQUIREMENTS

On February 19, 1993, the USEPA issued a final rule for the use and disposal of sewage sludge (40 CFR 503). This rule requires that producers of sewage sludge meet certain reporting, handling, and disposal requirements. The Territory has not been delegated the authority to implement this program, therefore, the USEPA Region 9 is the implementing agency. The permit contains biosolids/sludge management requirements consistent with 40 CFR 257, 258, and 503.

VI. PERMIT APPEALS

The final permit shall become effective 45 days from date of signature by the Regional Administrator. Any appeal of this permit will be processed by the USEPA Region 9 in accordance with 40 CFR 124, Subpart E.

Persons wishing further information may write to the following address(s), or call Robyn Stuber of USEPA Region 9 at 415/744-1921. Copies of materials in the Administrative Record (other than those which the USEPA Region 9 maintains as confidential) are available at the USEPA Region 9 office for inspection and copying between the hours of 8:00 a.m. and 4:30 p.m., Monday through Friday (excluding holidays).

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